SCREENING FOR UNDIAGNOSED DIABETIC SUBJECTS USING A SIMPLIFIED INDIAN DIABETES RISK SCORE [IDRS] IN KHAMMAM URBAN

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ABSTRACT

BACKGROUND

The rising prevalence of diabetes in developing countries is closely associated with industrialisation and socioeconomic development. The major determinants of diabetics in these countries are population growth, age structure, and urbanisation, prevalence of obesity because of increased intake of junk food, lack of physical activity, and stress among urban dwellers. Diabetes is increasingly concentrated in the urban areas. Hence, the present study was undertaken.

METHODOLOGY

A community based cross-sectional study was carried out in Raghunadhapalem, an urban area of Khammam with a total population of 1552. List of areas under Khammam (urban) was obtained from Municipal Corporation and the present study area Raghunadhapalem, was chosen by simple random sampling technique. Duration of the study was 4 months.

RESULTS

Majority 232 (74.3%) of study participants are at risk of developing Diabetes in future. Majority 291 (93.3%) of the study participants do not have family history of diabetes.

CONCLUSIONS

IDRS is a simple, useful and cost-effective screening tool for diabetes in resource limited settings. By identifying the high & medium risk individuals using IDRS, we could make screening programs more cost effective.

KEYWORDS

IDRS, Diabetes, MDRF, CURES.

INTRODUCTION: As per estimates of WHO, the number of people affected worldwide with diabetes were approximately 125 million which are expected to be almost 300 million by 2025. India has the unfortunate privilege of being the "Diabetes capital of the world. The prevalence rates have been estimated to be 12% in urban areas and 4% in rural areas. More concerning is the fact that diabetes prevalence over the past 4 decades has increased fourfold. Another interesting phenomena is that Indians who migrate to affluent countries develop very high prevalence rates of 10 to 20%, indicating the high racial predisposition that Indians and other South Asian populations have for diabetes, and which gets expressed whenever we get affluent conditions.

Diabetes is an "iceberg" disease. Although increase in both prevalence and incidence of type 2 diabetes have occurred globally, they have been especially dramatic in societies in economic transition, in newly industrialised countries and in developing countries.

Previously, a disease of the middle aged and elderly but now it is seen in all age groups. Increased urbanisation, industrialisation, change in lifestyle and dietary habits, sedentary life, stress were leading to early onset of diabetes especially younger age groups. If left undiagnosed, can lead to develop multiple chronic complications leading to irreversible disability and death. Early identification of at-risk individuals and appropriate lifestyle and dietary intervention would greatly help in preventing or postponing the onset of diabetes and thus reducing the burden on the community and the nation as a whole. Hence, the present study was undertaken. The simplified Indian Diabetes Risk Score [IDRS] developed by Dr. Mohan & colleagues at MDRF (Chennai) was used as a study instrument for screening of individuals for diabetes.[1]

AIM: The aim of this study was to detect undiagnosed diabetes among the subjects using a simplified Indian Diabetes Risk Score.

METHODOLOGY: List of areas under Khammam (urban) was obtained from Municipal Corporation and the present study area Raghunadhapalem, was chosen by simple random sampling technique (lottery method).

A Community based cross-sectional study was carried out in Raghunadhapalem, an urban area of Khammam with

a total population of 1552. Duration of the study was 4 months. Indian Diabetes Risk score (IDRS) was used as a screening tool for prediction of diabetes developed by Dr. Mohan & colleagues at MDRF (Chennai).[2]

Inclusion Criteria: All the individuals aged > 20 years who were present and willing to participate in the study are included in the study.

Exclusion Criteria: All the individuals aged < 20, who were present at the time of study and not willing to participate in the study were excluded in the study.

Whole population was taken into account who met the eligibility criteria as study participants & who were available at the time of conducting the study. Among the total population of 1552, 754 were adults. Of the 754, 352 were present at the time of our study. Among 352, 312 satisfied our inclusion criteria (i.e. were willing to participate in the study). Oral informed consent was obtained from the individuals before the commencement of the study. In all subjects, age, family history of diabetes was obtained and details on physical activity were assessed using a validated questionnaire. Waist measurements in centimetres were obtained using standardised techniques. Data was analysed using MS Excel and SPSS version 21. Chi square test with p value was used to test the association between IDRS scores and different variables.

Indian Diabetes Risk Score [IDRS] developed based on Multiple Logistic Regression Analysis derived from CURES (Chennai Urban Rural Epidemiology Study).[2]

Age [Years]	Score
< 35 [Reference]	0
35 – 49	20
≥50	30
Abdominal Obesity	**Score**
Waist <80 cm [female], <90 [male] [reference]	0
Waist ≥ 80 – 89 cm [female], ≥ 90 – 99 cm [male]	10
Waist ≥90 cm [female], ≥ 100 cm [male]	20
PHYSICAL ACTIVITY	**SCORE**
Regular vigorous exercise or strenuous activities at home/work	0
Regular moderate exercise or moderate physical activity at home/work	10
Regular mild exercise or mild physical activity at home/work	20
No exercise and/or sedentary activities at home/ work	30
FAMILY HISTORY OF DIABETES	**SCORE**
No family history [reference]	0
Either parent	10
Both parents	20

IDRS ranges from a Minimum score of 0 to a Maximum score of 100.

Subjects with an IDRS of <30 were categorised as low risk, 30-50 as medium risk and those with ≥60 as high risk for diabetes.

RESULTS: A total of 312 people participated in the study. Among them, 150(48.1%) were males and 162 (61.9%) were females. The age ranged between 19 to 85 years. The mean age for population was 54 with a standard deviation of 17.5. Majority had waist circumference of 80-89 cm (males), 90-99 cm (females) 145 (46.5%). Few had waist circumference of >90 cm/>100 cm, (females) 37 (11.9%). Majority of the study subjects were farmers or labourers by occupation, very few 29 (9.3%) had sedentary lifestyle. Majority of the participants did not have family history of diabetes. Only 21 (6.6%) had family history of diabetes, at least one parent was diabetic.

		IDRS Score	No. (%)
Age	<35 yrs.	0	74 (23.7%)
	35–49 yrs.	20	98 (31.4%)
	≥50	30	140 (44.9%
Abdominal obesity	Waist <80 cm [female], <90 [male] [reference]	0	130 (41.7%)
	Waist ≥ 80–89 cm [female], ≥90–99 cm [male]	10	145 (46.5%)
	Waist ≥90 cm [female], ≥ 100 cm [male]	20	37 (11.9%)
Physical activity	Regular vigorous exercise or strenuous activities at home/work	0	80 (25.6%)
	Regular moderate exercise or moderate physical activity at home/work	10	132 (42.3%)
	Regular mild exercise or mild physical activity at home/work	20	71 (22.8%)
	No exercise and/or sedentary activities at home/ work	30	29 (9.3%)
Family history of diabetes	No diabetes in parents	0	291(93.3%)
	One parent is diabetic	10	19(6.1%)

	Both parents are diabetic	20	2(0.6%)

Table 1: IDRS of the Study Participants

IDRS Score	No. (%)
0 (no risk)	18(5.8%)
< 30 (low risk)	62(19.9%)
30 – 50 medium risk	165(52.8%
≥60 (high risk)	67(21.5%)
	312(100%)

Table 2: Classification of Study Participants According to IDRS

	Variables		Indian Diabetes Risk Score (IDRS)				p value
		No. (%)	>=60 (High Risk)	30-50 (Medium Risk)	<30 (Low Risk)	No Risk	
Age	<35	74(23.7%)	0 (0%)	12(7.3%)	44(71%)	18(100%)	P= 0.000
	35-49	98(31.4%)	13(19.4%)	73(44.2%)	12(19.3%)	0(0%)	
	>50	140(44.9%)	54(80.6%)	80(48.5%)	6 (9.7%)	0(0%)	
Sex	Males	150(48.1%)	41(61.2%)	63(38.2%)	36(58%)	10(55.6%)	P=0.001
	Females	162(51.9%)	26(38.8%)	102(61.8%)	26(42%)	8(44.4%)	
Waist	<80	130(41.6%)	7(10.4%)	54(32.7%)	55(88.7%)	14(77.8%)	P=0.000
	80-89	145(46.5%)	23(34.3%)	111(67.3%)	7(11.3%)	4(22.2%)	
	>90	37(11.9%)	37(55.3%)	0(0%)	0(0%)	0(0%)	
Family history	NO	291(93.3%)	53(79.1%)	161(97.6%)	59(95.1%)	18(100%)	P=0.000
	YES	21(6.7%)	14(20.9%)	4(2.4%)	3(4.9%)	0(0%)	
Total		**312**	**67**	**165**	**62**	**18**	

Table 3: Association between IDRS and Sociodemographic Variables

On applying chi-square test, statistical significant difference was found between IDRS and gender, age, waist circumference and family history.

DISCUSSION: In this study, we report on a simplified Indian Diabetes Risk Score for identifying newly diagnosed diabetic subjects in our country. This is of great significance as use of such scoring system could prove to be a cost effective tool for screening of diabetes. Further, use of such a risk score would be of great help in developing countries like India where there is a marked explosion of diabetes and over half of the cases remain undiagnosed diabetes.

As there are ethnic differences in the risk factors for diabetes, it becomes necessary to determine ethnic specific scores. The risk factors used in this study are those recommended by the American Diabetes Association. Table 1 shows that among the participants, 150 (48.1%) were males and 162 (51.9%) were females. We had stratified the age group of the respondents according to IDRS and 74 (23.7%) were in the age group of 20-34 years, 98 (31.4%) were in the age group of 35-49 years and 140 (44.9%) were ≥ 50 years. Geetha M et al[3] observed in their study that 14% of study subjects were <35 years of age which is lower, and 55% of study subjects were ≥50 years which is higher while 31% belonged to age group of 35-49 years which is similar to the findings of present study.

Chowdhury R et al[4] observed in their study that 47.2% of study subjects were in the age group of 20-34 years which is higher, 28.5% were in the age group of 35-49 years which is lower while 24.3% were ≥50 years which is lower compared to present study finding.

In the present study, it was observed that 21.5%, 52.8%, 19.9% of the individuals were in High, Moderate, and Low risk group, but in a study done by S. Patel et al,[5] it was found that 23%, 48.57% and 7.20% respectively for developing type 2 DM. This simple and cost effective IDRS could thus serve as a tool for a primary care physician or a health worker to identify at risk individuals for both diabetes and cardiovascular diseases. In a study done by S Nandeshwar et al,[6] it was observed that 51.16%, 8.4% were in high risk and moderate risk group contrary to our findings. Various studies in the West have derived different diabetes risk scores, based on simple anthropometric, demographic and behavioural factors to detect undiagnosed diabetes.[7,8,9,10] On applying chi-square test, it was found that statistically significant difference was observed between IDRS and age, gender, waist circumference and family history.

CONCLUSIONS:
- This simplified Indian Diabetes Risk Score is useful for identifying undiagnosed diabetic subjects in India and requires minimum time and effort & will help to reduce the costs of screening considerably.
- By identifying the high & medium risk individuals using IDRS we could make screening programmes more cost effective.

RECOMMENDATIONS:
- The medium & high risk individuals are needed to be identified.
- These people are advised to visit nearest health care facility for an appropriate diagnostic tests & intervention.
- However, lifestyle modification is advocated right across the spectrum of IDRS.

REFERENCES
1. Mohan V, Deepa R, Deepa M, et al. A simplified Indian diabetes risk score for screening for undiagnosed diabetic subjects. JAPI 2005;53:759-763.
2. Deepa M, Deepa R, Shanthirani CS, et al. Awareness and knowledge of diabetes in Chennai – the Chennai urban rural epidemiology study (CURES – 9). J Assoc Physicians India 2005;53:283-287.
3. Geetha M, Kalaivani A, Raja D. Application of Indian diabetes risk score in screening of an undiagnosed rural population of Kancheepuram District, Tamil Nadu- a cross-sectional survey. NRIMS Journal of Health Sciences 2014;2(2):81-83.
4. Chowdhury R, Mukherjee A, Lahiri SK. A study on distribution and determinants of Indian diabetic risk score (IDRS) among rural population of West Bengal. National Journal of Medical Research 2012;2(3):282-286.
5. Patel S, Tyagi A, Waran M, et al. Evaluation of risk for type 2 diabetes mellitus in 1st degree relatives using Indian diabetes risk score IDRS. SJAMS 2015;3(6B):2298-2300.
6. Nandeshwar S, Vishal J, Pal DK. Indian diabetes risk score for screening of undiagnosed diabetic subjects of Bhopal city. NJCM 2010;1(2):176-177.
7. Lindstrom J, Tuomilehto J. The diabetes risk score: a practical tool to predict type 2 diabetes risk. Diabetes Care 2003;26(3):725-731.
8. Nelson KM, Boyko EJ. Predicting impaired glucose tolerance using common clinical information: data from the third national health and nutrition examination survey. Diabetes Care 2003;26(7):2058-2062.
9. Spijkerman AM, Yuyun MF, Griffin SJ, et al. The performance of a risk score as a screening test for undiagnosed hyperglycemia in ethnic minority groups: data from the 1999 health survey for England. Diabetes Care 2004;27(1):116-122.
10. Glumer C, Carstensen B, Sandbaek A, et al. A Danish diabetes risk score for targeted screening: the inter 99 study. Diabetes Care 2004;27(3):727-733.